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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,347	12/21/2000	Eugene Y. Ivanov	TSO 167 P2	1238

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EXAMINER

EDMONDSON, LYNNE RENEE

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 07/11/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/720,347

Applicant(s)

IVANOV ET AL

Examiner

Lynne Edmondson

Art Unit

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 28-33 and 40 is/are allowed.
- 6) ☒ Claim(s) 1-25, 27 and 34-39 is/are rejected.
- 7) ☒ Claim(s) 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 16 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 16 restates the temperature of consolidated as stated in claim 1 line 11.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1-8, 10-17, 27, and 35-39 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-20 of copending Application No. 10/030996. Although the conflicting claims are not identical, they are not patentably distinct from each other because both teach a method of preparing a bonded sputter target backing plate assembly comprising a

Art Unit: 1725

target composed of metal or metal alloy and a backing plate member, an improved method for joining the target and backing plate along mating surfaces (identical preamble, instant claim 1, '996 claim 1) by forming a plurality of projections (instant claim 1a) or projecting male portions ('996 claim 1a) in at least one of the mating surfaces to extend into and mechanically lock over the other mating surfaces (instant claim 1a) which fit into the female recesses (mating surfaces) in the other of said mating surfaces ('996 claim 1a), positioning the target and backing plate adjacent each other to form an assembly having an interface defined by said mating surfaces (instant claim 1b and '996 claim 1b) and pressure consolidating said assembly under low temperature conditions (instant claim 1c, '996 claim 1c). Both assemblies comprise a peripheral boundary which is bonded (instant claim 2, '996 claims 2 and 17) in a particular sequence (instant claim 3, '996 claim 3) by e-beam welding, interposing a weldable filler, friction welding or TIG welding (instant claims 4-7, '996 claims 4-7, 18 and 19). The target comprises Cu or Cu alloys (instant claims 8 and 10 and '996 claims 8 and 16). Both teach e-beam welding the target along an annular zone adjacent the peripheral boundary (instant claim 11, '996 claim 9). Both teach pressure consolidation at about room temperature and annealing (instant claims 12 and 13 and '996 claims 10 and 11). Both teach consolidation at a temperature of less than 50% of the melting point of the lower melting member at a sufficient pressure (instant claim 14 and '996 claim 12), particularly at temperatures below 100 C (instant claim 15, below 200 C '996 claim 13), below 38 C (instant claim 1, '996 claim 14) and about room temperature (instant claim 17 and '996 claim 15). Both teach the assembly formed by the method

Art Unit: 1725

(instant claim 27 and '996 claim 20). Both teach methods of low temperature bonding with e-beam welding at the periphery in a particular sequence (instant claims 35 and 38 and '996 claims 2- 4) with a welding filler (instant claim 36 and '996 claim 5) and annealing step (instant claim 39 and '996 claim 11). Both teach similar methods comprising friction welding and a Cu target (instant claim 37 and '996 claim 8). However instant claim 1 is slightly narrower in that the low temperature is defined.

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform the low temperature bonding a temperature slightly higher than room temperature such as 38 C to increase the speed of bonding without changing the microstructure at the interface and thereby form a reliable bond in fast and cost-effective manner.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

Art Unit: 1725

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1, 8, 9, 12, 14-22, 27 and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Fan (USPN 5269899).

Fan teaches a method of preparing a bonded sputter target/backing plate assembly comprising an Al target and Cu backing plate wherein a plurality of salient (grooved) portions are formed on at least one of the mating surfaces (figure 1 and col 4 lines 1-17). The plate and target are positioned adjacent one another forming an interlocked interface with a bent portion forming an angle of 45 degrees. Pressure is applied to consolidate the assembly under low temperature (room temperature) (col 4 line 48 col 5 line 34). It is noted that the combination can be formed by any method.

6. Claims 18, 22 and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Hunt et al. (USPN 5836506).

Hunt teaches a method of preparing a bonded sputter target/backing plate assembly comprising an Al, Ti or Co target and an Al, Cu, steel or Ti backing plate (col 4 lines 16-24 and col 8 lines 17-40) wherein a plurality of salient (grooved) portions are formed on at least one of the mating surfaces (col 3 lines 50-60). The plate and target are positioned adjacent one another forming an interlocked interface. Pressure is applied to consolidate the assembly under low temperature (below 50% of melting points of plate and target metals) (col 4 lines 25-46, col 6 lines 27-50 and col 8 lines 1-18). Note that Al which has a melting point of 680 C is heated to 300 C (col 4 lines 28-29 and col 7 line 21). As shown in figures 8 and 9 the edge is bent at an angle of less

Art Unit: 1725

than about 90 degrees and forms "V" shaped ridges (col 6 lines 13-38). As shown in figure 4, these ridges are continuous which would form "M" shapes. It is noted that the combination can be formed by any method. See also Hunt claims 1-19.

7. Claims 35, 36 and 38 are rejected under 35 U.S.C. 102(e) as being anticipated by Demaray et al. (USPN 6199259 B1).

Demaray teaches a method of preparing a bonded sputter target/backing plate assembly comprising an Al or Ti target and an Al backing plate (col 6 lines 35-44 and col 9 line 64 – col 10 line 6) wherein a plurality of projected portions are formed on at least one of the mating surfaces (fins 51, 59a, figures 4 and 13 and col 9 lines 21-43). The plate and target are positioned adjacent one another to form an interface defined by the mating surfaces. Pressure is applied to consolidate the assembly under low temperature (soldering temperatures, 156C - 177 C) through a filler (solder, col 3 lines 13-21 and col 13 lines 27-52). It is noted that the combination can be formed by any method. The peripheral area is welded (sealed) by e-beam welding (col 5 lines 1-18, col 9 lines 44-63 and figures 13-15). See also Demaray claims 1, 4, 7, 15-22 and 15-22, 28 and 32.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 1725

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt et al. (USPN 5836506) in view of Qamar (USPN 5009765).

Hunt teaches a method of preparing a bonded sputter target/backing plate assembly comprising an Al, Ti or Co target and an Al, Cu, steel or Ti backing plate (col 4 lines 16-24 and col 8 lines 17-40) wherein a plurality of salient (grooved) portions are formed on at least one of the mating surfaces (col 3 lines 50-60). The plate and target are positioned adjacent one another forming an interlocked interface. Pressure is applied to consolidate the assembly under low temperature (below 50% of melting points of plate and target metals) (col 4 lines 25-46, col 6 lines 27-50 and col 8 lines 1-18). Note that Al which has a melting point of 680 C is heated to 300 C (col 4 lines 28-29 and col 7 line 21). As shown in figures 8 and 9 the edge is bent at an angle of less than about 90 degrees and forms "V" shaped ridges (col 6 lines 13-38). As shown in figure 4, these ridges are continuous which would form "M" shapes. See also Hunt claims 1-19. However, there is no disclosure of peripheral welding, TIG welding or of a filler material.

Qamar teaches joining a grooved Al target and Al backing plate (figures 1 and 7) wherein the peripheral boundary is sealed by a TIG weld (figure 3 and col 2 line 63 – col 3 line 15). The target has projections (shoulders, 20 and 48) which mate with a recess (30) on the other surface (figure 3 and col 3 lines 53-60). Parts are positioned (col 4

Art Unit: 1725

lines 1-16 and lines 58-68) and the groove is filled with a welding material (col 8 lines 1-14). See also Qamar claims 1-20.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ the known method of TIG welding which typically employs a filler material to provide a strong reliable bond (Hunt, col 2 lines 9-19) of materials with different expansion rates and thereby prevent failures at the interface particularly with large targets and thereby provide an assembly that can be used over a wide range of power levels and temperatures (Hunt, col 2 lines 58-65 and col 4 lines 39-46) in a simple and conventional manner.

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt et al. (USPN 5836506) in view of Dunlop et al. (JPN 06-065733 A).

Hunt teaches a method of preparing a bonded sputter target/backing plate assembly comprising an Al, Ti or Co target and an Al, Cu, steel or Ti backing plate (col 4 lines 16-24 and col 8 lines 17-40) wherein a plurality of salient (grooved) portions are formed on at least one of the mating surfaces (col 3 lines 50-60). The plate and target are positioned adjacent one another forming an interlocked interface. Pressure is applied to consolidate the assembly under low temperature (below 50% of melting points of plate and target metals) (col 4 lines 25-46, col 6 lines 27-50 and col 8 lines 1-18). Note that Al which has a melting point of 680 C is heated to 300 C (col 4 lines 28-29 and col 7 line 21). As shown in figures 8 and 9 the edge is bent at an angle of less than about 90 degrees and forms "V" shaped ridges (col 6 lines 13-38). As shown in

Art Unit: 1725

figure 4, these ridges are continuous which would form "M" shapes. See also Hunt claims 1-19. However, there is no disclosure of a Cu target.

Dunlop teaches joining a grooved Al or Cu target and an Al or Cu backing plate bonded under pressure and low temperatures (abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a Cu target bonded to an Al backing plate as an obvious variation of the Al target to Cu backing plate bond to provide a strong reliable bond (Hunt, col 2 lines 9-19) of materials with different expansion rates and thereby prevent failures at the interface particularly with large targets and thereby provide an assembly that can be used over a wide range of power levels and temperatures (Hunt, col 2 lines 58-65 and col 4 lines 39-46) when Cu is the desired deposition material.

Response to Arguments

11. Applicant's arguments with respect to claims 2-7, 23-25, and 35-39 have been considered but are moot in view of the new ground(s) of rejection.

12. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., projections which penetrate or extend into the opposing interfacial surface) are not recited in the rejected claim(s). Although the claims are interpreted in light of the

Art Unit: 1725

specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The claim states that the projections extend into and lock over the other mating surface. The teeth 140 of target 100 extend into recesses 350 of backing plate 200 and lock over them in mating engagement (figure 7 and col 5 lines 3-34). The target is subject to torque to effect engagement (col 4 lines 48-55 and claim 1).

The method is performed at room temperature which is below 38 C. This temperature is also considerably lower than the melting point of copper. As shown in figure 7, the tooth tips are angled forming a locking grip in the recess.

Therefore the 102 rejection of claims 1, 8, 12, 14-22 and 27 as anticipated by Fan stands and now includes claims 9 and 34.

13. In response to applicant's argument that Hunt does not teach a consolidation temperature, particularly a low temperature or angled tip, see col. 3 lines 35-49, particularly lines 48 and 49 which teach that the assembly is bonded by heating and pressing the parts together. The heating temperature of about 300 C for aluminum and about 540 C for copper (about half the melting point of both, Al m.p. 660 C, Cu m.p. 1084 C) is taught in col. 4 lines 25-32. The angled tip of the projection or salient portion is shown in figure 9.

Therefore the 102 rejection of claims 18 and 22 as anticipated by Hunt stands and now includes claims 34.

Art Unit: 1725

14. In response to applicant's argument that Zhang is not available as prior art under USC 103 (c) it is noted that Zhang was not applied in any 103 rejections. However, the rejections based on Zhang are withdrawn due to the lack of a consolidation temperature below 38 C or a second angle on the tip (tooth).

Allowable Subject Matter

15. Claims 28-33 and 40 are allowed.

16. The following is an examiner's statement of reasons for allowance: The closest prior art teaches the invention essentially as claimed but teaches a single angle at the projecting tip rather than a first and second angle. See Fan (USPN 5269899) and Hunt (USPN 5269899). Neither does the prior art teach the claimed configuration formed at low temperature having inclined or angular projections with an e-beam peripheral weld. See applicant's copending application 10/030996.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Art Unit: 1725

17. Claim 26 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

18. The following is a statement of reasons for the indication of allowable subject matter: The closest prior art teaches the invention essentially as claimed but does not teach peripheral e-beam welding, friction welded cu targets or low temperature annealing after welding at a temperature below 38 C. See Boys (USPN 5215639) and Hunt (USPN 5836506). When e-beam welding is taught, the assembly comprises a different configuration. See Strothers (USPN 5143590).

Conclusion

19. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ogata et al. (JPN 02-043362, grooves, filler), Taniguchi et al. (JPN 04-168267, grooves, filler)Matsuoka et al. (JPN 59-232270, grooves), Arima (JPN 04-128371 A, grooves), Ogata et al. (JPN 02-043362 A, grooves, combination), Yoshimura et al. (USPN 6074279, high temperature bonding), Takahashi et al. (USPN 6451135 B1, Cu target), Gilman et al. (USPN 6164519, grooves, combination), and Kardokus et al. (USPN 6113761).

20. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynne Edmondson whose telephone number is (703)

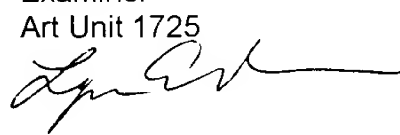
Art Unit: 1725

306-5699. The examiner can normally be reached on Monday through Thursday from 6:30 a.m. to 5 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7718 for regular communications and (703) 305-7115 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

Lynne Edmondson
Examiner
Art Unit 1725

A handwritten signature in cursive script, appearing to read 'Lynne Edmondson', followed by a date '7/7/03' written in a similar cursive style.

LRE
July 7, 2003